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Transportation News

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Washington State Department of Transportation

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April 2001

Changing of the guard

Secretary of Transportation Sid Morrison retires
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Doug MacDonald new Secretary of Transportation
- Commission page

Design-build pilot starts in Clark County

By Theresa Weil

Work has launched on a new interchange at State Route (SR) 500 and Thurston Way in Clark County that will be Washington's first design-build demonstration project.

An April 6 ground-breaking ceremony in Vancouver marked the start of the \$23-million design-build test case – which will reduce the number of accidents at one of Clark County's busiest intersections. Secretary of Transportation Sid Morrison, who led the ceremony, said the interchange will also increase road capacity - and reduce congestion for Vancouver-area drivers.

A change from traditional methods that allow innovation and can produce quicker results by overlapping the design and construction phases of a transportation project - design-build is a construction approach that WSDOT and the state legislature have been wanting to test for several years.

Transportation agencies typically develop plans for highway projects using their own staff or consultant engineering firms. Then they advertise the project - and select the contractor with the lowest bid to build the designed project. In contrast, design-build projects use one team or company to design and construct the project.

Reasons for using design-build include:

- it saves time because the design phase can overlap construction
- it allows for innovation because the designer and contractor work more closely together
- it transfers risk from the transportation agency to the design-build team because the design-builders develop the construction plans and are responsible for any plan errors that affect construction costs.

"Although not intended to replace the standard design-bid-build method - which is successful for most projects - design-build offers transportation agencies another 'tool in the toolbox' for delivering projects," said WSDOT's Southwest Region Administrator Don Wagner.

On projects where completion time is critical and when other factors are present, design-build can be a viable alternative. The design-build approach appears most useful on projects where there are minimal environmental issues - and additional right-of-way and access control are not required. The 1998 Legislature authorized WSDOT to go ahead with a demonstration

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Nisqually quake not a 'design event'

How's bridge seismic work coming along?



Photo by Grace Eubanks

In a smiling mood after the state's bridges survived the recent earthquake in good style, WSDOT's Bridge Preservation Engineer Harvey Coffman (left) acts as navigator as Bridge Management Engineer Ed Henley "drives" the department's new 30-foot Under-Bridge Inspection Truck.

By Grace Eubanks

"This was not what we call a 'design event'," said Bridge Management Engineer Ed Henley. "No doubt, it was a significant event - but since the early 1980s, we've designed Washington's bridges to withstand much more."

Henley, who manages the Washington State Department of Transportation (WSDOT) program that's been retrofitting vulnerable state bridges to make them sturdier in surviving earthquakes, was discussing the recent Nisqually earthquake.

He gave a recap of how the state-owned bridges fared during the magnitude 6.8 quake - and reported that they came through quite well.

(For the story of bridge damage and how the Bridge Preservation Office's "war room" operated in the post-quake hours, please see pages 6.)

"Although this was a major event, it still had only about one-third of the ground motion that we design bridges for today," said Chuck Ruth, Bridge Design Engineer, whose staff provides the designs and contract plans for the department's

Status: 350 bridges done; 979 bridges to go

seismic retrofit program.

Ruth's team ensures that all new state bridge construction in Washington complies with the ever-improving national seismic design codes.

When there's a seismic event, it rekindles citizen, elected officials' and media interest in the survivability of bridges, noted State Bridge & Structures Engineer Jerry

Weigel. "People want to know how safe our bridges are," said Weigel, "and what's being done to make them safer, if needed."

The Bridge & Structures Office has issued this status report: Of the state's 3,154 bridges, nearly 350 bridges will have been retrofitted by this July, with up to 979 bridges still requiring retrofit.

WSDOT created a Bridge Seismic Retrofit Program over a decade ago. Bridge engineers considered all state-owned bridges - their type (design), location and age - and made a "to do" list.

The initial cost forecast in 1990 was \$250 million.

First, the retrofit plan team, which included Henley and Bridge Preservation Engineer Harvey Coffman,

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Five join Washington's Aviation Hall of Fame

Five aviation enthusiasts were inducted into the Washington State Aviation Hall of Fame at the Northwest Aviation Conference and Trade Show in February. Those whose names have been added to the Hall of Fame Award, which is on display at WSDOT's Aviation Division in Seattle. Are:

Ilovene Potter
Potter earned her private pilot certificate in 1941. She was the first woman in Washington State – and the 50th woman in the world – to receive her helicopter certificate in the early 1960s. There was no helicopter training in Seattle at that time, so Potter would travel in her Piper Aztec 100 miles round trip to Centralia to complete her lessons. Later, she was the captain of the first U.S. helicopter team to compete in world competition in England, where she met with Prince Phillip. Her photograph is now hanging in the Smithsonian Institute as part of the “Women in Aviation” display.



Peter M. Bowers
An aviation historian, photographer and longtime columnist for the Flyer Newspaper, Peter Bowers began his aviation writing career in the mid 1930's. He earned his pilot's certificate in 1948 - and has in excess of 8,000 flight hours, mostly in low-powered aircraft and gliders. He spent 36 years as an engineer with the Boeing Company. Bowers had his own ideas of aircraft design - and in 1962, his Bowers Fly Baby won the Experimental Aircraft Association's design contest. More than 500 Fly Baby's have been built and flown from his set of plans.

Lester H. Mills
Lester Mills was a pioneer in agricultural aviation. He had a lifelong fascination with aviation. As a boy, he attached wings to his bicycle and rode it off a cliff, almost killing himself, as he liked to tell the story. He began his flying career in 1937 in a J-2. In 1940, as a shipyard worker, he received his commercial license - but continued with the shipyard because he couldn't make a living by flying. He was involved in one of the first aerial application jobs in Washington. In an attempt to control crickets in Eastern Washington, he flew a SM8A Stinson while another individual scooped a mix of insecticide provided by the state out a camera hole in

the belly of the plane. In 1943 Mills flew the first crop dusting missions in the Northwest, dusting potatoes in the Kittitas Valley.

Moulton (Molt) B. Taylor
Molt Taylor, who passed away in 1995 after more than 50 years of aviation research and invention, began his aeronautical career with the U.S. Navy during World War II. He was instrumental in developing the Navy's remote-piloted aircraft program, attempting to guide a remote-controlled airplane to its target. We now know this as the Tomahawk Missile. He was the designer of the IMP, the mini IMP, the Coot and the Micro-IMP. He also is credited with the design of several unusual and interesting aircraft, the U.S. Navy XLRQ-Amphibious Assault Glider, and his best-known invention, the “Aerocar,” the Flying Car. After his death the Kelso-Longview Regional Airport officially became the Kelso-Longview Regional Airport-Molt Taylor Field.

Vernon C. Mitchell
Vernon Mitchell began flying at age 15. A pilot with an excess of 20,000 hours, he was an Air Transport Pilot, Certified Flight Instructor, Agricultural applicator, Helicopter CFI and FAA Examiner. He also was a very accomplished aerobatic instructor - and some of his past students are among the nation's best known aerobatic pilots. He had given over 1000 check rides before his untimely death in a crop dusting accident at age 53. Vern founded Mid State Aviation in Ellensburg, which the family still runs. Vern was known for his skill as a crop duster - and was one of the primary people responsible for the program we now know as the Aviation Degree Program at Central Washington University. For additional information on the Hall of Fame Awards, contact Mac McIver, WSDOT Aviation Division, (206) 764-4131.

Design-build (continued from page 1)

of design-build. In December 2000, the Blue Ribbon Commission on Transportation recommended that the state should “Incorporate the design-build process and its variations into construction projects to achieve the goals of time-savings and avoidance of costly change orders.” The SR 500 / Thurston Way Interchange Project is scheduled for completion in October 2002. Contractors are a partnership of construction and design firms - Max J. Kuney Company of Spokane, a construction contractor, and Entranco of Bellevue, a design firm. •

Seismic work

(continued from page 1)

were able to exclude all Washington bridges built after 1980 “because they all have been designed to meet current seismic standards.” The state is composed of three seismic hazard zones. Zone “A” traditionally has the lowest seismic activity (Eastern Washington) – “B” is the moderate risk area, “where you're getting into higher ground acceleration (generally Central Washington) – and “C” is the highest risk area (the nine counties surrounding Puget Sound).

Bridges locations were factored into their ranking on the work list. The WSDOT retrofit program includes vehicular bridges and some pedestrian bridges that don't meet ductility (“the bend-without-breaking”) requirements for current national seismic standards.

“It does not include rail bridges,” noted Henley. “They belong to the railroads.”

The bridges were divided into three categories: single column, multiple column and special (the major or unique-design bridges).

The seismic retrofit program also is divided into three work phases.

Phase 1, which is nearly completed, has included tying spans together and providing beam seat extensions to prevent spans from pulling away from their supports.

Phase 2 includes bridges with the most vulnerable type of support – the single column bridges – and some of the major and unique-design spans.

“Single column doesn't mean just one support column at either end of the whole bridge,” explained Henley. “It means a single column at each end of each bridge span. A structure might have seven spans.

“Nevertheless, it's obvious that a single-column bridge is vulnerable to failure because it has no backup at each of its strategic points,” he said.

The special class structures “were unique enough that, to come up with a practical retrofit plan, we had to do an in-depth seismic study for each,” Henley reported.

In this special category are Seattle's Ship Canal and Aurora Avenue bridges - movable span bridges, such as those in Aberdeen, Hoquiam, Seattle and Marysville - and the Tacoma Narrows Bridge.

“The focus of the program over the next several years (Phase 2) is to complete the retrofit of bridges with single column supports – and the retrofit of the 15 remaining major bridges,” said Henley.



The afternoon of the quake, WSDOT Bridge Engineer Paul Knaebel boards a helicopter at the Mottman Road office for an inspection tour of Puget Sound bridges.

Phase 2 is estimated to cost \$83 million – and, if given full funding, could be completed by 2008.

The third, and final, phase of the program will involve the retrofit of 784 bridges that have multiple column supports. The Phase 3 cost is estimated at \$190 million.

The retrofit program was initially approved for funding by the legislature in 1991 - and became part of the Highway System Plan (HSP) approved by the 1995 Legislature. The HSP documents all of the Washington highway system's factual needs over a period of 20 years.

Funding forecasts for each need (work program) are set at the total cost it would take to get that work accomplished in the following two decades.

The seismic program manager pointed out that the \$250 million total cost estimates prepared in 1990 were on the mark. The updated 2000 total-program estimate is \$340 million, with \$275 million remaining at this time. This translates to about 3 percent annual inflation between 1991-2000. (Note: Neither of these forecasts has included a

retrofit estimate for Seattle's Alaskan Way Viaduct, which is currently under study.)

When asked for an estimate of when the whole seismic effort will be completed, Henley commented, “It was designed in 1990 to be a 20-year program. But it hasn't been fully funded (HSP level) – so that changes the clock.”

For the 1999-01 Biennium, the program was at first fully funded at the HSP level of \$15 million a year.

However, the post-695 funding level for 99-01 of \$11 million per year slowed the pace of retrofit work, making the forecast finish in 2024.

Getting full HSP level of funding in 2001-03 would allow completion of the retrofit of all bridges in the program around 2019.

Meanwhile, WSDOT's seismic retrofit crews will continue wrapping bridge columns with steel jackets, adding footing reinforcement and making other improvements.

“The Nisqually quake wasn't the event we have been preparing our bridges for,” said Weigel.

“But we'd just as soon never get one that size.” •

EX•PRESS

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